

The safety value of driver education and training

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Background: New drivers, especially young ones, have extremely high crash rates. Formal instruction, which includes in-class education and in-vehicle training, has been used as a means to address this problem.

Objectives: To summarize the evidence on the safety value of such programs and suggest improvements in program delivery and content that may produce safety benefits.

Methods: The empirical evidence was reviewed and summarized to determine if formal instruction has been shown to produce reductions in collisions, and to identify ways it might achieve this objective.

Results: The international literature provides little support for the hypothesis that formal driver instruction is an effective safety measure. It is argued that such an outcome is not entirely unexpected given that traditional programs fail to address adequately the age and experience related factors that render young drivers at increased risk of collision.

Conclusions: Education/training programs might prove to be effective in reducing collisions if they are more empirically based, addressing critical age and experience related factors. At the same time, more research into the behaviors and crash experiences of novice drivers is needed to refine our understanding of the problem.

New drivers, especially young ones, have extremely high crash rates. For example, Williams¹ reported that in 1995 in the United States, 16 year old drivers were involved in 35 crashes per million miles of travel, compared to drivers in their 20s and early 40s who were involved in nine and four crashes, respectively, per million miles. A major reason that young drivers are over represented in road crashes is because they are inexperienced, lacking the necessary driving skills and capabilities.² This is not surprising because driving is a complex, self paced activity involving a myriad of basic tasks (for example, steering, braking) and higher order skills (for example, hazard perception, problem solving), many of which are essential to safe vehicle operation.^{2,3}

A prevalent response to address the complexities inherent in driving has been to ensure that the needed skills and capabilities are provided before full licensing is permitted. This is usually done either less formally under supervision of a parent or other adult licensed driver, or formally under professional in-class and in-vehicle instruction, or both. There has always been considerable expectation for the value of formal education and training. Indeed, such programs are generally accepted as an efficient and effective means for learning to drive and for preparing to take the road test, which sets the minimum driving standards in a jurisdiction.

Teaching the skills needed to pass the road test, however, is not the only, or most important, stated objective of driver education and training programs. The principal goal of many, if not most, driver education and training programs is to produce "safer" drivers, defined in terms of collision involvement. Simply put, it is assumed that drivers exposed to formal instruction should have lower crash rates than those who do not receive such instruction, that is, those who learn to drive informally. Despite the belief in the safety value of driver education, programs have not proven effective. As counterintuitive as this may seem, empirical evidence supporting the safety benefits of formal driver education/training is lacking. Numerous studies have failed to show any positive effects and some even suggest that such programs pose a safety risk because they lead to earlier licensure.

Concern about the problem of young driver crashes, and a growing recognition of the failure of formal driver instruction

to resolve it, has led in three inter-related directions. First, new licensing approaches to reducing the crash risk of young novice drivers have been sought and, in North America, this has resulted in the development of a system called graduated driver licensing (see Williams and Ferguson, and McKnight and Peck in this supplement). Second, the recent adoption of graduated licensing has also resulted in heightened interest in improving the delivery and content of driver education and training programs. Third, these recent developments have also led to interest in parent supervised practice as a means to increase overall practice and accelerate skill development (see Simons-Morton and Hartos in this supplement).

In this paper, we will review the empirical evidence on the safety effectiveness of driver education and training, consider the reasons why the research has not been able to identify consistent and long term safety benefits of such programs, and discuss improvements in driver education/training that may produce safety benefits.

EVIDENCE ON SAFETY EFFECTIVENESS

In 1996, the current authors produced a report that provided a contemporary review of the value of driver education/training, particularly in relation to new licensing systems, such as graduated ones.⁴ It reviewed 30 studies from several countries that examined the effectiveness of formal driver education/training, motorcycle rider education/training programs, and advanced training courses for novice drivers. That review of scientific evaluations provided little support for the claim that driver instruction is an effective countermeasure. The preponderance of evidence failed to show that formally trained students have a lower frequency of crashes than those who do not receive such training. Even more discouraging, a few studies even showed a safety disbenefit—that is, an increase, rather than a decrease, in crash involvement. In some cases, this occurred because driver education resulted in

Abbreviations: ADTSEA, The American Driver and Traffic Safety Education Association; NHTSA, National Highway Traffic Safety Administration; RACV, Royal Automobile Club of Victoria

earlier licensure, and consequently, more crashes. On balance, the weight of the evidence did not favor the hypothesis that formal instruction provides safety benefits.

Since the publication of our report, there have been four major, independent, reviews of evaluation research on the safety benefits/disbenefits of driver education and training. These contemporary reviews reached the same conclusions as we did in our earlier report. For example, researchers at the John Hopkins School of Public Health recently reviewed nine studies that met their quality criteria⁵ and concluded that:

“There is no convincing evidence that high school driver education reduces motor vehicle crash involvement rates for young drivers, either at the individual or community level. In fact, by providing an opportunity for early licensure, there is evidence that these courses are associated with higher crash involvement for young drivers” (p. 40)

Two reviews on the effectiveness of driver education/training have also recently been published in Australia. Woolley,⁶ in a study for Transport South Australia, reviewed the international literature on the effectiveness of in-car training in high schools and concluded that:

“Very little new evidence has emerged to support driver education and training in high schools and the bulk of the scientific literature is damning of the ability of high school driver education and training to deliver net road safety benefits. Such education generally leads to increased licensure rates and younger driver ages, causing problems which far outweigh any benefits achieved” (p. ii)

Christie,⁷ in another Australian study, examined the international literature on the effectiveness of driver training as a road safety measure. His focus was broader than both the Vernick *et al* study and the Woolley study on high school based driver education/training programs in that he investigated the safety value of such programs for three distinct groups: learner drivers; young/recently licensed drivers; and experienced drivers. His comprehensive review suggested that for learner drivers:

“Pre-license driver training/education contributes little to post-license reductions in casualty crashes or traffic violation ... In addition, mandatory pre-license training or even formal pre-license training/education, such as high school driver education programs in the USA, may contribute to increased exposure-to-risk for young drivers, particularly females, by encouraging early solo licensing. There is also considerable evidence that driver training that attempts to impart advanced skills such as skid control to learner drivers may contribute to increased crash risk, particularly among young males” (p. iv)

His review of the evaluation studies of post-licensing training programs for novice drivers also resulted in a similar conclusion: “there is no clear evidence that post-license training for novice drivers leads to reductions in crash or violation involvement” (p. v). Moreover, he found no “sound evidence that either advanced or defensive driving courses reduce the accident involvement of experienced drivers who attend them” (p. v).

A review of the safety effectiveness of school based driver education, by the Cochrane Injuries Group in the United Kingdom, reported similar conclusions. Roberts and Kwan⁸ observed the following:

“The results show that driver education leads to early licensing. They provide no evidence that driver education reduces road crash involvement, and suggest that it may lead to a modest but potentially important increase in the proportion of teenagers involved in traffic crashes” (p. 1)

In summary, our 1996 review, and several more recent ones, provide little support for the hypothesis that driver instruction is an effective safety countermeasure. There is no clear and convincing evidence that driver education/training, particularly the traditional formula, which is 30 hours in-class education and six hours in-vehicle instruction, impacts safe driving and reduces the elevated crash risk of young novice drivers.

REASONS FORMAL INSTRUCTION FAILS TO REDUCE CRASHES

A critical issue is whether formal driver instruction can have the potential to produce bottom line safety benefits. The answer to this question is speculative, but some insights can be gained through a consideration of why such programs have not been effective.

Driver education/training fails to teach the knowledge and skills critical for safe driving

As observed by Simpson,⁹ there is general agreement that to achieve its loss reduction potential, driver education/training should focus on those aspects of the driving task that are linked to the risk of collision. However, definitive research on the critical age and experience related factors that render young drivers at increased risk of collision has been slow to accumulate, so the empirical basis for curriculum development has been limited. Nonetheless, there is an existing pool of knowledge that can and should be used as the basis for developing training/education programs.²

Many, if not most, existing driver education courses actually do cover at least some of the psychomotor, perceptual, and cognitive skills that have been shown to place young drivers at increased risk of collision. The problem is that they are usually covered in a relatively superficial manner, owing to the scope of topics being presented and the limited time frame available. Most programs typically involve 30 hours in-class education and six hours in-vehicle training. The effectiveness of courses might be improved through a more judicious selection of content, with emphasis being placed on those skills that have been shown to be related to collision involvement, such as hazard recognition and risk assessment.^{2,4}

The safety impact of driver instruction might also be improved if it emphasized not only learning of key skills and capabilities, but also their acquisition in situations that are most relevant, such as in situations where young drivers are at high risk. In this context, the driving conditions in which young drivers have been shown to be over represented, or at high risk, should be the primary focus. Of course, the challenge is to design such learning experiences, either real or simulated, that do not place the novice or the instructor in situations that can have negative consequences.

The impact of improved skills training, however, will likely not reach its potential unless driver education/training also effectively addresses the age related factors that contribute to the higher crash risk of young drivers. Young novices have a greater likelihood of being involved in a collision because risky behaviors and attitudes are so prevalent among adolescents. And regardless of their skill level, young people are relatively immature and unmotivated to drive safely. Indeed, their primary motivation is simply to obtain a driver's license.^{2,9}

Driver education does teach safety skills but students are not motivated to use them

Perhaps forces and conditions beyond the control of the driver education environment mitigate the beneficial effects of safety training. As Waller¹⁰ suggested nearly three decades ago, driver education does instill the necessary knowledge and skills; it gives students what they require in order to be safer drivers. But it cannot ensure that those skills will be put into practice; it cannot influence how students will eventually choose to drive. On the one hand, this leads to a rather pessimistic forecast for driver education. It implies that driver education will never be able to achieve the goal of reducing the collision involvement of its graduates because of the countervailing influence of factors related to how young people eventually choose to drive. On the other hand, this could be regarded as an opportunity for driver education. If it can be accepted that driver education and training is effective in teaching knowledge and skills, or that it could be structured to be effective, the challenge would be to determine how driver education could also enhance the likelihood that these capabilities will, in fact, be used.

The crucial link between motivation and the success of driver education has also been noted by McKnight.¹¹ He points out that a primary and very legitimate motivation for students in traditional driver education courses is to obtain their license. As a consequence, they learn information and skills most germane to that goal. They are not particularly motivated to learn safe driving practices, which are also not relevant to them, since they have very little driving experience at this point. For these reasons, McKnight suggested a unique and somewhat revolutionary perspective on driver education. He argued that “when” things are taught might be as important, if not more important, than “what” is taught. An optimal system would be to provide instruction in basic skills prior to licensing, with instruction in safe driving practices not being offered until after licensing. A key point here is that the experience gained in real world driving following licensing would make instruction in safe driving practices more meaningful. According to McKnight,¹² however, “the challenge that faces the traffic safety community is finding ways to provide learning experiences that will yield the same benefits as those gained from driving, but without the same risks” (p. 35).

Christie⁷ has also proposed a different type of training program to more effectively address factors such as attitudes and motivation that shape the driving behavior of young novices. He suggested the use of “education programs delivered over several years, perhaps through secondary schools, to foster development of safe attitudinal/motivational factors, using driver testing as motivator” (p. vii).

Driver education fosters overconfidence

It has been suggested that training new drivers, particularly in emergency maneuvers and collision avoidance techniques, fosters overconfidence and thereby increases risk rather than reduces it. For example, evaluations have found that advanced training in skid control does not reduce crash involvement. One possible explanation for this finding is that situations that precipitate the need for emergency skills arise infrequently, so the requirement to deploy these skills is also infrequent. And, given that there is poor retention of skills that are used infrequently,¹³ advanced skills learned over a relatively short period of time may tend to erode and not be readily available or inappropriately applied in emergency situations one or two years later. As observed by Christie,⁷ “drivers quickly forget those behaviors, which they do not have to use regularly. This is not unique to driving, people lose competence in respect to any set of skills which are not practiced, or are engaged in only rarely” (p. vi).

But perhaps of greater importance, the results of several evaluation studies show that course graduates actually have

higher collision rates than individuals who did not receive such training.⁴ An explanation for these findings is that advanced skills training leads to overconfidence which may eliminate normally cautious behavior. It can also result in a greater willingness to put oneself at risk. For example, graduates of advanced skill courses will be less reluctant to drive in adverse conditions because they are confident that they can handle them.

What seems needed then is a means to provide emergency maneuver training without instilling the unwanted overconfidence. Perhaps rather than teaching emergency responses and anticipatory skills, exercises could be developed so that the perceptions of risk and the driver's limitations are stressed more than the actual training of skilled performance. Drivers in advanced courses may need to develop insight into their own limitations. In this regard, Gregersen¹⁴ has concluded that if drivers are taught only to be skilled, they believe they can handle situations better than they really can. But if they are taught that they should not always rely on their skills and that they should be aware of their own limitations, the overestimation of abilities is considerably lower. For this reason, Gregersen believes that skill training should be complemented with, or replaced by, insight training.

Driver education fails to adequately address lifestyle issues

Recent research has shown that in addition to the set of psychomotor, perceptual, and cognitive skills, broader psychosocial characteristics are related to the collision involvement of young drivers.² Psychosocial variables that describe a pattern of behavior, such as risk taking and sensation seeking, are commonly referred to as “lifestyle” and there is now considerable evidence about the strong relation between lifestyle and collisions involving young drivers.¹⁵

At issue is the extent to which short term programs, such as driver education, can influence lifestyle and those psychosocial factors that give rise to the risky driving behavior of young people. Simpson⁹ indicates that although opinion is divided, there is growing recognition in the field that modifying lifestyle problems does fall within the purview and capacity of the traffic safety system and that there is really no need to assume that addressing lifestyle variables requires the system to reach back into the developmental process. Rather, it might involve moving or compressing the natural developmental process that extends from the age of licensing into the early 20s.

There is general agreement that as part of the developmental process many young people eventually “mature out” of risky driving and that the changes in lifestyle behavior that occur over several years contribute to lower collision rates.⁹ In doubt, however, is the extent to which this process can somehow be accelerated or compressed and whether this can occur in a driver education context. Certainly, the task of shaping or modifying risky driving behaviors that reflect adolescent lifestyle is a daunting one and will require a better understanding of the developmental and psychosocial context in which such behavior takes place.

The point is that lifestyle clearly influences how the young person chooses to drive. Indeed, some authors have suggested that these factors are so powerful they offset benefits that might arise from driver education. Figuring out how to temper the countervailing influences of lifestyle factors would be challenging, and whether this is something that might be achieved through driver education remains uncertain. There is no empirical evidence available that would settle the question and opinion remains sharply divided.

Driver education fails to tailor content to student needs

Not all young drivers are at the same levels of skill, intelligence and reasons for taking training, nor do they choose to drive

the same vehicle, for example, a motorcycle versus a car. Accordingly, trainees who begin with a relatively low level of skill development could conceivably benefit from skill training. For others who are more skilled in operating the vehicle, training may only provide a means to reduce insurance premiums or to satisfy a parental demand and, as such, will likely provide few safety benefits. In this context, better information is needed from evaluation research regarding who does and does not benefit from current programs, and why. Such information would provide a basis for developing and tailoring formal education and training programs to the specific needs of the novice driver. In the interim, competency based programs that focus on evaluating student performance and recognize that students have varying levels of knowledge, skills and capabilities may have some merit.⁴

IMPROVING THE SAFETY VALUE OF DRIVER EDUCATION AND TRAINING

Based on his recent review of the evaluation literature, Christie⁷ suggested alternatives to conventional driver training, including an extended period of supervised driving and graduated driver licensing. Similar conclusions were expressed in the review of the evaluation literature by Vernick and colleagues,⁵ and Woolley,⁶ who called for “parental involvement whereby driving exposure during the critical learner driver phase is increased prior to unaccompanied driving” (p. i).

Programs such as graduated licensing that encourage greater parental involvement in supervised practice, and minimize exposure to high risk situations, should be vigorously promoted. In this regard, most jurisdictions in North America have already implemented, or will soon be implementing, this safety measure which has proven effective in reducing young driver crashes.¹⁶ It is also important, however, not to abandon driver education/training as some might suggest because of its poor safety record. New opportunities for driver education and training as a means for preventing collisions involving young novices need to be examined.

Linking driver education to graduated licensing

The advent of graduated licensing has actually rekindled an interest in driver education/training and the role that it might play.⁴ A key question is whether driver education/training should be linked with graduated licensing. Certainly, jurisdictions should not feel compelled to create a formal link between graduated licensing and driver education and, if they do, the training should not receive special status such as being allowed to substitute for time in the system; for example, it should not be recognized through a “time discount” because of the safety disbenefits.⁴ Efforts should be made to improve the form and content of the education/training experience. Although the benefits of any improvements have not been established, they may offer promise and can only be evaluated if implemented.

Improvements to driver education/training in a graduated licensing program should be multiphased to harmonize with the graduated licensing process that becomes progressively less restrictive as the novice moves towards full licensure. Despite this prominent feature of graduated licensing, most systems that include driver education/training do so only as part of the learner’s stage. As a consequence, driver education/training does not fit well with the multiphased graduated licensing system. To rectify this situation, the National Highway Traffic Safety Administration (NHTSA) has recommended a two-stage driver education program: a basic driver education course in the learner stage of graduated licensing and a more advanced safety oriented course in the intermediate stage.¹⁷ A rudimentary multistaged driver education/training and graduated licensing system is in place in Michigan.

The notion of multiphased driver education is certainly not new. As mentioned previously, McKnight¹¹ recommended post-licensing instruction of higher order skills over 15 years ago. Furthermore, although graduated driver licensing programs do not exist in Europe, several countries have multiphased driver education programs. For example, in Finland, the compulsory second phase of driver training focuses on avoidance of risk situations rather than the mastery of technical skills.¹⁸ In the recent DAN report (Description and Analysis of post licensing measures for Novice drivers) Bartl¹⁹ recommends multiphase driver education similar to the Finnish model.

The American Driver and Traffic Safety Education Association (ADTSEA) has also been working closely with NHTSA to develop new curriculum standards for multistaged driver education. Robinson²⁰ uses the term “advanced driver education” to refer to a new approach to training young drivers in a graduated licensing system. He states that “initial training of novice drivers will provide basic vehicle handling skills and the second training course will provide other safe driving skills, including enhanced decision making to reduce the risk of young drivers.”

CONCLUSION

Traditional, short term, driver education/training programs of 30 hours in-class education and six hours in-vehicle instruction should move towards the multistage approach promoted by NHTSA and ADTSEA. The role that driver education/training can play in augmenting and improving parent supervised practice driving within a graduated licensing system also needs to be examined. Several states, including Hawaii, Ohio, and Texas, are revising their driver education curricula with the help of ADTSEA. However, if driver education/training is to be integrated with a graduated licensing system, the proposed program should be carefully scrutinized to determine if it addresses certain key areas:

- The program content should be empirically based and focus on those psychomotor, cognitive, and perceptual skill deficiencies that have been shown to be associated with high collision rates of novice drivers
- The curriculum should include experiences that demonstrate the value of safety practices and, thereby motivate novices to drive safely
- Training strategies should be incorporated to make novices aware of their limitations and counteract the problem of overconfidence
- Teaching methods and techniques should be developed to address lifestyle and psychosocial factors that can mitigate any beneficial effects of training and lead to risky driving behaviors
- Competency based programs that recognize individual differences and are tailored to address the specific skill deficiencies of novices should be included.

Fortunately, there are several current initiatives in the field of driver education in North America and elsewhere that attempt to address some of these issues. These range from the development of new curriculum for use in-class and in-vehicle instruction, to CD-ROM, interactive, home-based programs. These initiatives focus not only on learners but on licensed teen drivers as well. Moreover, most of these programs recognize the importance of practice under supervision, so they encourage or require parental involvement in the learning process. The impact of these potential improvements, however, has not been established. It cannot be assumed that just because a program addresses factors that have been shown to be associated with high collision rates of novice drivers that the program will have loss reduction benefits. Nonetheless, effectiveness can only be determined if new programs are encouraged and implemented on an experimental basis.

Although much may be accomplished in improving the form and content of programs through the informed use of currently available information, more research into the behaviors and crash experiences of novice drivers is needed to identify the key experience related and age related factors that render novice drivers at greater risk. The generation of such information in the future, combined with a better understanding of the safety effectiveness of recent initiatives, can continue to provide guidance to improving the delivery and content of training programs.

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DISCUSSION PAPER

The stated purpose of the paper by Mayhew and Simpson is excellent. However, it needs to be expanded and clarified. The studies they cited are historical in nature; there is no new information. They are simply restating that driver education does not reduce fatal crashes. However, no one countermeasure alone will reduce fatal crashes: driver licensing does not and graduated driver's licensing (GDL) requires several components before it is determined beneficial. Thus, when determining the value of driver education, we need to look at a broader view.

VALUE OF DRIVERS' EDUCATION

Driver education has many values to parents and new drivers alike beyond what safety researchers tend to evaluate. We live in a society that demands the use of automobiles for school, work, and recreation. Our economy evolves around mobility. Therefore, the value of driver education is obtaining a driver's license, going to school, going to work, and all other uses of cars. For example, why would we have School To Work programs if the student has no way to get to work? As young drivers mature and gain experience, they are involved in vehicle crashes. This may be as much the fault of the system as it is driver education.

We have continued to evaluate driver education using official accident records to measure a reduction in fatal accidents, and researchers have had difficulty with this because sample sizes in the accident database are not large enough to draw conclusions. A reduction in non-reported crashes would have a cost benefit to society. If we broaden our evaluation to include self reported accidents, surveys, and insurance records, we can get a better picture of the value of driver education. To only rely on official accident reports limits the ability to do a thorough analysis of driver education. When we evaluate seat belt use campaigns, it is considered successful if the use rate increases. This has been true in Pennsylvania even though the number of unbelted fatalities has increased at the same time.

IMPROVING DRIVERS' EDUCATION

Improving driver education should be the goal of all who truly have an interest in highway safety. Driver educators alone cannot improve driver education programs. The general public and highway safety professionals view driving as a simple task and have been bombarded by the publicity that driver education does not work. However, all must discontinue under appreciating the driving task and the benefits of driver education if we are going to make any effective changes. There must be a strong coalition of advocates behind changes to driver education.

Two good examples of efforts to change driver education is the two-phase driver education program being demonstrated in Michigan and the long time proposed suggestions of McKnight,¹ recommending post-licensing instruction of higher order skills. According to McKnight, post driver training should focus on avoidance of risk, decisions concerning right and wrong, and value clarification. This would also be the appropriate time to deal with all occupant protections and alcohol driving problems. The traditional view has been that any program for young drivers must be completed by age 18. It certainly should be completed prior to full licensing, no matter what age. All involved in highway safety need to look beyond the traditional walls of what is needed to improve highway safety. This would include the age of licensing, the way people are trained, and how the public acquires the necessary training, and licensing.

AN IDEAL LICENSING SYSTEM

Rather than to continue evaluating the old forms of driver education, we need to make significant changes in driver education and driver licensing of young drivers. In an ideal GDL program, a permit to drive can be issued at age 16. This permit must be held until age 17 or a minimum of 12 months. During this 12 month permit, the new operator must: complete basic driver education; verify 50 hours of specific practice driving with an adult supervisor; and meet passenger restrictions, night driving restrictions, and zero tolerance.

At age 17 or after 12 months driving on a learners permit, most of the restrictions would be eliminated except for zero tolerance and mandatory seat belt use. During this stage of licensing and before full licensing, new drivers must be crash free, violation free (needs definition), and complete a theory program in risk assessment, decision processing, alcohol/drug problems, and occupant protection. If they have crashes, alcohol offenses, or serious driving violations, they would be required to take a specific course related to their violation and then operate a motor vehicle properly for 12 months. After 12 months of successful driving on a restricted license and meeting all of the above, they would be issued a full license.

These are bold and probably unpopular recommendations that can only be undertaken with a broad coalition of highway

safety agencies and a significant public relations campaign, followed by the development of programs to meet these needs.

CONCLUSION

Graduated driver licensing should be vigorously promoted and driver education should not be abandoned. Mayhew and Simpson state that new opportunities for driver education and training need to be examined as a means for preventing collisions involving young novices. I hope this means that a concentrated effort needs to be devoted to broadening our view on the role of driver education, improving driver education, and changing the ways we evaluate driver education.

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